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EXPERIENCE FACTORS IN PERFORMING PERIODIC PHYSICAL EVALUATIONS

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Although I had been involved with examining an asymptomatic population in the Flight Surgeon's Office since 1940, I became immersed in the problem of the Periodic Health Examination (PHE) during the period 1958-1968. In Headquarters Command, USAF, which is comprised mainly of personnel in the Washington, D.C. area, we performed a total of 10,000 to 12,000 complete physical examinations per annum. All personnel on flying status, inclusive of air controllers, parachute duty and physiological training were examined annually. Other officers were examined annually. Other enlisted men were examined on a quadrennial basis with additional examinations being done on assignment to Southeast Asia and isolated duty. About two-thirds of the enlisted men are under age 28 with only about 10,000 at age 50 and above. It should be kept in mind that at the induction centers the hypertensives, those with valvular heart disease, with muscular-skeletal defects, with gross mental and neurologic disorders, diabetics, albuminurics, those with deafness and severe visual errors, are screened out. Even so, at the Basic Military Training Center, another group is washed out within a few weeks primarily with skeletal and mental defects.

With the Examination Unit manned by trained physicians and adequate paramedical personnel, we were faced with these pressures:

- Deadlines for Southeast Asia and isolated duty
- Separations - Reenlistments
- USAF Academy applicants
- AFROTC candidates and members
- Periodic Health Examinations

It takes an extremely well motivated physician, extra inducements or the beatings of war drums to maintain enthusiasm in working in such a unit for longer than 30 days. To overcome the tedium, we used aviation medical technicians to do required measurements, purely mechanical procedures and to record this data, thereby reserving to the physician the elements of judgment. He was also charged with health counseling.

We also instituted an Executive Health Program involving an average of 1500 senior individuals/annum. Cost analysis ranged from \$100 to several hundred per assessment. The find was minimal and extremely expensive. At age 45, proctosigmoidoscopic examination was added to the annual examination. Beginning at age 50, we added special X-ray diagnostic procedures on five year cycle allowing one per/annum: gastro-intestinal series, gallbladder series, barium enema and urogram. By 1967, it was felt that these special studies were non-productive. G.I. series disclosed

peptic ulcer deformity in 19%, known prior to the procedure; hiatus hernia 11.4% of which 6.3% was known before; barium enemata disclosed diverticuli of the colon in 2.5% with half known before; cholecystogram showed silent gallstones in 3.8%; intravenous pyelography had no pay off.

In 1957 we did sugar loading on 3000 successive examinees and found only two mild middle-age diabetics. In 1960 we began to do routine testing of intraocular tension with the Schiotz tonometer at time of periodic examination beginning at age 40. We did find a few with preglaucoma but caused more to suffer with a chemical burn of the eye.

An analysis for our 1964 experience is shown on the following charts.

CHART #1
Waivers Granted - 1964
Common Conditions

	Flying Personnel (3565)	Non-Flying Officers (5914)
Abnormal ECG	5	3
Hypertension	6	8
Hiatal Hernia	4 (#3)	5
Carcinoma of skin	5	8
Presbyopia	115 (49%)	4
Refractive error	3	8
Distant vision	83 (35%)	-
Exophoria	6	-
Preglaucoma	5	-
Diabetes mellitus	-	8
Duodenal ulcer	2*	1

*detected at clinic

CHART #2
Abnormal ECG - 1964

<u>Flying</u>		
Non-specific T wave change, normal variant	age 45	DIF
Non-specific T wave change, labile	age 45	DIF
Non-specific T wave change, labile	age 45	DIF
Silent anteroseptal infarction	age 43	DNIF
RBBB, complete	age 26	DIF (airman)
<u>Non-Flying</u>		
Non-specific T wave change, normal variant	age 43	Duty
PVCs & ST-T wave change	age 52	Retention
Probably anterior septal infarction	age 40	Retention

CHART #3
HYPERTENSION

1. Dg of Essential Hypertension, mild, made on 6 of rated group (3565).
DP 100 mm Hg. Ages: 39, 42, 44, 46, 46, 48. All on status.
2. Dg likewise made in 8 of non-flying officer group (5914).
Ages: 42, 44, 45, 47, 47, 49, 52, 52. All on duty.

DIABETES MELLITUS

1. Found in 8 non-flying officers (5914).
6 at times of physical examination
2 at sick call
2. All are mild and controlled by diet.
3. Two were overweight.
4. Ages: 39, 46, 46, 46, 48, 49, 50, 53.

My basic dissatisfaction with the PHE methodology came to a head in 1964 triggered after reviewing an article in the December 1964 issue of the Annals of Internal Medicine on the evaluation of the PHE by participating groups. This paper showed that coronary artery disease was recognized before death in only 58% and malignant disease in 43%. I do not mean to infer that we did not find pathology. We found all kinds at the clinic. The average military member is reluctant to describe signs and symptoms at the time of his periodic examination. Independently, Gordon S. Siegel, M.D. (Ref. #1) arrived at a similar conclusion, namely, that he challenged the PHE premise of discovering disease (or disease propensity) in the asymptomatic stage permitting favorable intervention. I agree with him that the premise of the PHE still has to be proved. Dr. Siegel urges early sickness consultation (ESC), coupled with the use of periodic selected disease screening procedures, as being effective and a more practical public health measure.

In 1967, I recommended the following to the Air Force Surgeon General:

- (1) At time of examination, a meticulously documented medical history to include a medical record review and an inventory of systems.
- (2) At time of retirement for length of service or medical retirement, the following tests to be incorporated in the Standard Form 88:

(a) Blood urea nitrogen or creatinine.
 (b) A two-hour postprandial blood sugar after priming for three days before with a daily diet containing at least 300 gms of carbohydrate.

(c) A VDRL or other test for syphilis (STS).

(3) Other procedures recommended for consideration but not mandatory:

(a) A proctosigmoidoscopic examination for asymptomatic examinees at age 44 on a triennial basis and converting to a biennial basis at age 50.

(b) One barium enema during the fifth decade of life.

(c) Complementing PA of chest radiograph with a left lateral view.

I participated in a special committee to establish for the Air Force a program for periodic medical examination with frequency and scope. In general, most of our study was accepted for implementation in August 1968.

<u>Category</u>	<u>Frequency</u>	<u>Special Studies</u>
Pilots, Navigators, Flight Mechanics, Flight Engineers, Boom Operators, Gunners, Loadmasters	Annually	Baseline ECG on record. ECG annually at 35 yrs and thereafter. Tonometry at age 39. If normal, repeat every second year. Rectal, age 39 and annually.
Flight Surgeons Flight Medical Officers Flight Nurses, Medical Techs and all Noncrew Members	Biennial beginning at age 19 thru 59; annually above 60.	Baseline ECG on record. ECG at age 35 yrs and each exam thereafter. Tonometry and rectal exam at 39 yrs and each exam thereafter.
Other Officers and Airmen	27, 31, 35, 39, 42, 45, 48, 50, 54, 56, 58, 60 and annually thereafter.	Baseline ECG for 35th birthday, if not already in record. ECG, tonometry and rectal exam at time of periodic evaluation beginning at age 39.
Female Officers	Same as above group except annual limited exam	Same as above. Limited scope to include pelvic and breast exams and Pap smear.
Air Controllers Weapons Controllers Physiological Trng Pers Parachute Duty Pers Missile Launch Crew	Annual	Baseline ECG for 35th birthday. ECG annually, age 39 and over. Rectal exam annually, age 39 and over. Tonometry at age 39. If normal, repeat every 3rd yr.

This schema will probably result in an overall reduction of examinations and can probably be further reduced by the universal usage of the FULHES system. It is hoped that the flight surgeon will have more time to spend with his charges exclusive of the business of performing examinations.

The Air Force seems to be heading in the right direction of multiple screening and providing maximum coverage in sensitive areas. In the civilian community, much of the problem could be resolved if a thorough baseline assessment were done in the late teens or in the twenties age group. This having been done, a system of multiple screening could be established in relation to the age of the group. As an example, I propose that we look at the following areas in an asymptomatic population:

Systems

Periodicity

Eyes: vision and intraocular tension	Start at age 40; repeat every 5 years.
Allergies: nose, sinuses, lungs, eyes, skin	Check once at age 30.
Thyroid	Age 30; recheck every 5 years.
Cardiovascular	Check at age 30 with baseline ECG. Recheck every 5 years. Consider stress test.
Pulmonary	Check at age 30. Ventilatory study. Repeat every 5 years.
Metabolic	Check for gout at age 30; repeat every 10 years. Check for diabetes mellitus at age 40; repeat every 5 years.
Rectum	Rectal examination at age 40. Repeat every 5 years.
Genitourinary	Check at age 40. Repeat every 5 years.
Dental	Periodontal survey at age 35 and repeat every 5 years.
(Female-breasts & pelvic organs)	Annal (include hemoglobin)
Blood	BUN, hematocrit, cholesterol, etc. Age 30 and every 5 years.

This plan would theoretically locate potential disorders. In regard to the eyes, presbyopia would be corrected. Intraocular tension should be measured with the applanation tonometer by an ophthalmologist or a trained technician. This equipment is expensive. The fundi should be visualized.

Allergy in one form or another involves 5% to 20% of the population. Prevention and treatment are available.

Thyroid disorder is concerned with goiter, thyroiditis and cancer detection together with underfunction and overfunction.

The cardiovascular system deals with hypertension, valvular heart disease and atherosclerosis. It has been demonstrated that a regular exercise program (Ref. #2) with the individual's limitation improves the blood lipid pattern. Exercise and diet have a favorable effect on the arterial tree.

Pulmonary scrutiny looks for infection, emphysema, bronchitis and asthma.

Metabolic factors may indicate middle-age diabetes mellitus, usually controlled by weight loss, and gout controlled by allopurinol. In ages between 55-74, annual rates of diabetes for males ranges between 100 and 125/100,000 and for female between 160 and 200/100,000. Frequency of hyperuricemia involves 1 to 2% of the general population. Gouty arthritis involves about 1% of the U. S. population and contributes to 4-5% of the arthritic population.

Rectal examination should be expanded to proctosigmoidoscopic technic at age 45 and one barium enema in the fifth decade. In the 1960 incidence of cancer of the colon/100,000 for men was 29.9, for women 34.2; incidence of cancer of the rectum for men was 20.2, for women 14.4. To state it another way, there is a tenfold increase of carcinoma of the colon and rectum between ages of 45 and 65.

Genitourinary examination is concerned mainly with urinalysis and palpation of the prostate as starting points. Carcinoma of prostate incidence is 42/100,000. The incidence of urinary tract infection and prostatism has to be clarified.

In the dental area, control of periodontal disease is required for adequate nutrition and elimination of constitutional effects. The incidence in the group over age 30 is well over 50%.

In regard to the female, incidence of the following cancers (1960) / 100,000 are as follows: breast - 72.6, uterine cervix - 28.7, body of uterus - 16.

At this point, I would like to make reference to an EDP system of acquiring a medical history. This can be modified and is available to analysis. The most important part of a screening procedure, PHE or a clinic visit or consultation is the medical history. In this area, the new Lahey Clinic Automated Medical History Questionnaire is an excellent example of comprehensive coverage and presentation of a functional printout to the physician. I believe that this technic can be used on any group being surveyed.

SUMMARY

My paper presents my feeling of the lack of scientific basis to the so-called PHE inclusive of the Executive Health Program. This latter program can well represent a management tool of the company involved in addition to being a status symbol. I have proposed consideration to a multiphasic screening technic in conjunction with an automated history questionnaire. The solution will be found by those concerned with preventive medicine - occupational medicine methodology. The need to collate early sickness consultation or clinic visit with screening technic is necessary.

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1. Siegel, G. S. An American Dilemma - The Periodic Health Examination. Arch. Environ. Health, 13:292, 1966.
2. Hoffman, A. A., Nelson, W. R. and Goss, F. A. Effects of an Exercise Program on Plasma Lipids of Senior Air Force Officers. Amer. J. Card., 20:516, 1967.